Hinatikatl, Central America.—G. S. WEST (Journ. Bot. **49**:82–89. 1911) under the heading "Algological notes" characterizes a new genus (*Oligochaetophora*); the genus is based on *Polychaetophora simplex* West, which was found originally growing on submerged portions of various aquatic flowering plants at Donegal, England.—J. M. GREENMAN.

Cecidology.—Among the most important of the recent papers on galls is that by DENIZOT[10] on the gall of *Andricus radicis*. This gall occurs on the roots of at least three species of oaks, and appears to resemble somewhat the American twig gall caused by *A. punctatus* Bassett. The gall is plurilocular, but its histological structure is very similar to the unilocular gall caused by *A. sieboldi*. The gall is made up primarily of parenchyma tissue, and each larva is surrounded by a definite structure as follows: (1) a zone of parenchyma tissue well filled with starch and known as the nutritive zone; the starch disappears with the growth of the larva and is supplanted by tannin and oil; (2) a protective zone of scelerenchyma tissue containing albuminoids and tannin. There is a gradual transition between these two zones. The superficial part of the gall is made up primarily of cork cells whose contents are reduced to a thin layer of tannin deposited against the inner walls. The tannin exists in all parts of the gall, but is most abundant in the parts referred to above, and increases in amount with the decrease in starch. It causes a coagulation of the contents of the cells, persisting in the protective cells in the form of grains, and in the cork cells as a thin peripheral layer. The reviewer has observed similar conditions in several of our American galls.

Another exceptionally good piece of work is that of HOUARD[11] on the action of certain scale insects on the plant tissues. His studies were restricted to *Asterolecanium variolosum*, *A. thesii*, and *A. algeriense* on *Quercus peduncularia*, *Q. sessiliflora*, *Q. pubescens*, *Pittosporum tobira* (an Asiatic plant), *Templetonia retusa* (an Australian plant). In all cases these insects cause cone-shaped swellings, and in the tip of each cone a depression in which the insect is located. The swellings are due partly to thickening of the bark and partly to a modification of the vascular bundles. The galls differ in accordance with the response of the vascular bundles to the stimulating influences of the insects; the more compact the bundle, the greater the resistance. If the bundles are compact, the hypertrophy of the medullary rays is slight and the bundles only slightly separated, thus making it difficult for the parasite to reach any great depth. In the case of *A. variolosum*, the vascular bundle responds to the action of the insect in the formation of new wood only. This new wood possesses an abnormal structure due to the sucking of the insect interfering with the normal differentia-

[10] DENIZOT, M. GEORGES, Sur une galle du chêne provoquée par *Andricus radicis* (Cynipide). Rev. Gén. Botanique **23**:165–175. 1911.

[11] HOUARD, C., Action de Cécidozaires externes, appartevant au genre *Asterolecanium*, sur les tissues de quelques tiges. Marcellia **10**:3–25. 1911.

tion of the fibers. The major part of this abnormal structure forms lignified cells with slightly thickened walls. In the case of *T. retusa*, the ring of vascular bundles presents enough resistance to prevent the hypertrophy of the medullary rays. However, *A. algeriense* has a stronger influence on the intermediate woody vessels, stopping their development and causing a hypertrophy of the thickened angles of the stem. The vascular bundles in the stem of *P. tobira* are much less resistant than in any of the preceding host plants; in this case the insect affects the bark, easily gains entrance to the medullary rays, and causes a hypertrophy which results in the separation of the vascular bundles. The modification of the tissues between the bundles is advantageous to the insect. In the petioles and midribs, the bundles do not form a complete ring and therefore are much less resistant than in the twigs, and are subject to much greater hypertrophy. In all cases, except the last, the external tissues of the stem undergo excessive hypertrophy and form the greater part of the gall.

The biology of galls is ably discussed by DR. ARTUR MODRY,[12] who gives a review of the subject and also the results of his own investigations. Although the study of galls is very old, it has attracted comparatively little attention from biologists. The workers on this subject have defined galls differently, but the definition given by BEYERINCK is most generally accepted at the present time. According to this definition, the gall is a "new formative growth within the body of the plant and is due to insects or plant organisms." THOMAS suggested the use of the word "cecidien" (meaning nut gall) as a substitute for all other terms; then subdivided the galls on basis of cause into Phyto-cecidien and Zoo-cecidien, and these groups into myco-, helminto-, phytopto-, entomo-cecidien, etc. Although this marked an advance in the study of cecidology, it was of very little botanical importance. This was largely over-come by KERNER,[13] who suggested the following divisions:

$$\text{Galls}\begin{cases}\text{simple}\begin{cases}\text{felt}\\ \text{mantle}\begin{cases}\text{scroll}\\ \text{pocket}\\ \text{covering}\end{cases}\\ \text{solid}\end{cases}\\ \text{compound}\begin{cases}\text{bud}\begin{cases}\text{foliage}\\ \text{flower}\end{cases}\\ \text{others}\end{cases}\end{cases}$$

This division has been of great value for descriptions. In 1904 ROSS suggested division into root, stem, leaf, and blossom galls. This division has been of considerable value, but was not very practical. LACAZE-DUTHIERS (1849–1853) suggested division into internal, external, and mixed galls. However, the greatest advance was made by KÜSTER, who as a result of his study

[12] MODRY, DR. ARTUR, Beiträge zur Gallenbiologie. Sechzigsten Jahresb. K.K. Staats-Realschule. 1911.

[13] KERNER AND OLIVER, The natural history of plants **2**:514–554. 1895.

of gall anatomy divided them into (1) galls without cell multiplication (enlargement of cells should not be confused with multiplication of cells), (2) soft galls, and (3) hard galls. The divisions are based on the character of the tissues of which the galls are composed. The author admits there are so many intermediate stages as to make these divisions in some cases very unsatisfactory. MODRY follows KÜSTER'S divisions, and gives a very comprehensive review of the various structural (both external and internal) characters of the various groups of zoo-cecidia. A review of this part of the paper would require entirely too much space and is entirely unnecessary for those who are familiar with the literature of the histology of galls.

Another paper of great interest to Americans is by TROTTER[14] on a collection from Washington, Oregon, Arizona, California, Hawaii, and Mexico. In this paper the author describes 88 species, of which 9 have been described. Of the remaining 79, 13 are given specific names and the remainder assigned to genera only. This paper is a most excellent illustration of our lack of knowledge of the American cecidia.

Dr. SCALIA[15] gives a very interesting discussion and description of a new species on *Cyclamen neapolitanum*, to which he assigns the name *Phyllocoptes Trotteri.*

One of the most valuable contributions to American cecidology in recent years is SMITH'S[16] paper on crown gall and sarcoma. In his recent bulletin on crown gall, Dr. SMITH calls attention to the resemblances of crown gall of plants to malignant animal tumors, especially to sarcoma. This resemblance has attracted the attention of many workers, but it remained for SMITH to demonstrate that it is something more than superficial. The questions previously unsolved which SMITH answers are (1) the presence of bacteria in the secondary tumors, (2) the origin of the secondary tumor from the primary to which it remains attached by strands of tumor tissue, (3) the structure of the secondary tumor is the same as that of the primary. The strand of tumor tissue connecting the galls works its way as an outgrowth from the primary gall, through the interior of the stem and leaves. At suitable places it undergoes enlargements, forming deep seated secondary galls which eventually become apparent on the surface. These tumor strands contain the bacteria which cause the disease. We are promised another bulletin on this interesting subject which we will await with great interest.

Another very interesting contribution, which the reviewer believes should

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[14] TROTTER, A., Contributo alla Conoscenza delle Galle dell America Nord. Marcellia **10**:28–61. *pl. 1. figs. 21.* 1911.

[15] SCALIA, DR. C., Nuova Species di Eriofide sul *Cyclamen neapolitanum* Ten. Marcellia **10**:62–64. 1911.

[16] SMITH, ERWIN F., Crown gall and sarcoma. Circular No. 85. U.S. Bureau of Plant Industry. 1911.

be included under cecidology, is that part of the work of EAST and HAYES[17] on inheritance in maize which refers to "plant abnormalities." In this part of the work, the authors state their objects as follows: "The first object was to see whether the manner of transmission of inheritable monstrous characters gives any clue to the reason why monstrosities have seldom obtained a foothold in nature when in competition with normal types. The second object was commercial. If teratological specimens appear in commercial varieties of maize, it is desirable to know the easiest method to destroy them." The authors discuss the appearance of and experiments with dwarf forms, irregularity of rows of seeds on cob, bifurcated ears, ears with lateral branches, plants with striped leaves, and hermaphrodite flowers. They call attention to the fact that many of these monstrous variations occur in strains that have been self fertilized for several generations, and suggest that inbreeding may give the same effect as lack of nutrients, while cross-breeding may give the opposite effect. Monstrosities are due to retardation or acceleration of cell divisions. The question is then raised as to whether the monstrosities might not be due to an abnormal distribution of the chromatin. Another paper is promised on the effects of inbreeding in maize.—MEL. T. COOK.

Recent papers on Phytomyxaceae.—MAIRE and TISON[18] have published a brief note on *Tetramyxa parasitica* Goebel, which produces galls on *Ruppia* and *Zannichellia*. The parasite appears in the host cell in the form of an amoeba, which undergoes division simultaneously with the host cell in such a way that at first only a single amoeba appears in each cell. During this stage the nuclei are said to divide in the manner described by NAWASCHIN and by PROWAZEK for *Plasmodiophora*. As these accounts differ somewhat as to detail, it may be inferred that the division in its main features follows the method common to the members of this group, by the formation of a chromatic ring around a karyosome, both of which divide. This stage is followed by the chromidial stage, during which the chromatin disappears from the nuclei and chromatic bodies appear in the protoplasm. Later the (same) nuclei appear with a chromatin network and undergo two karyokinetic divisions, which are followed by spore formation. Karyogamy was not observed.

In a second paper, MAIRE and TISON[19] describe a new genus, *Ligniera*, to include those species of the Plasmodiophoraceae which lack the schizogenous stage or have it very poorly developed, and which do not cause gall formation in the host plant. By these characteristics the genus is separated from the genera

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[17] EAST, E. M., and HAYES, H. K., Inheritance in maize. Conn. Agric. Exp. Station, Bull. 167. pp. 129–137. 1911.

[18] MAIRE, RENÉ, et TISON, ADRIEN, Sur quelques Plasmodiophoracées. Compt. Rend. **150**: 1768–1770. 1910.

[19] ———, Sur quelques Plasmodiophoracées non hypertrophiantes. Compt. Rend. **152**: 206–208. 1911.